



# ***Calibration of the CSC Electronics***

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***EMU meeting, Oct. 2006***

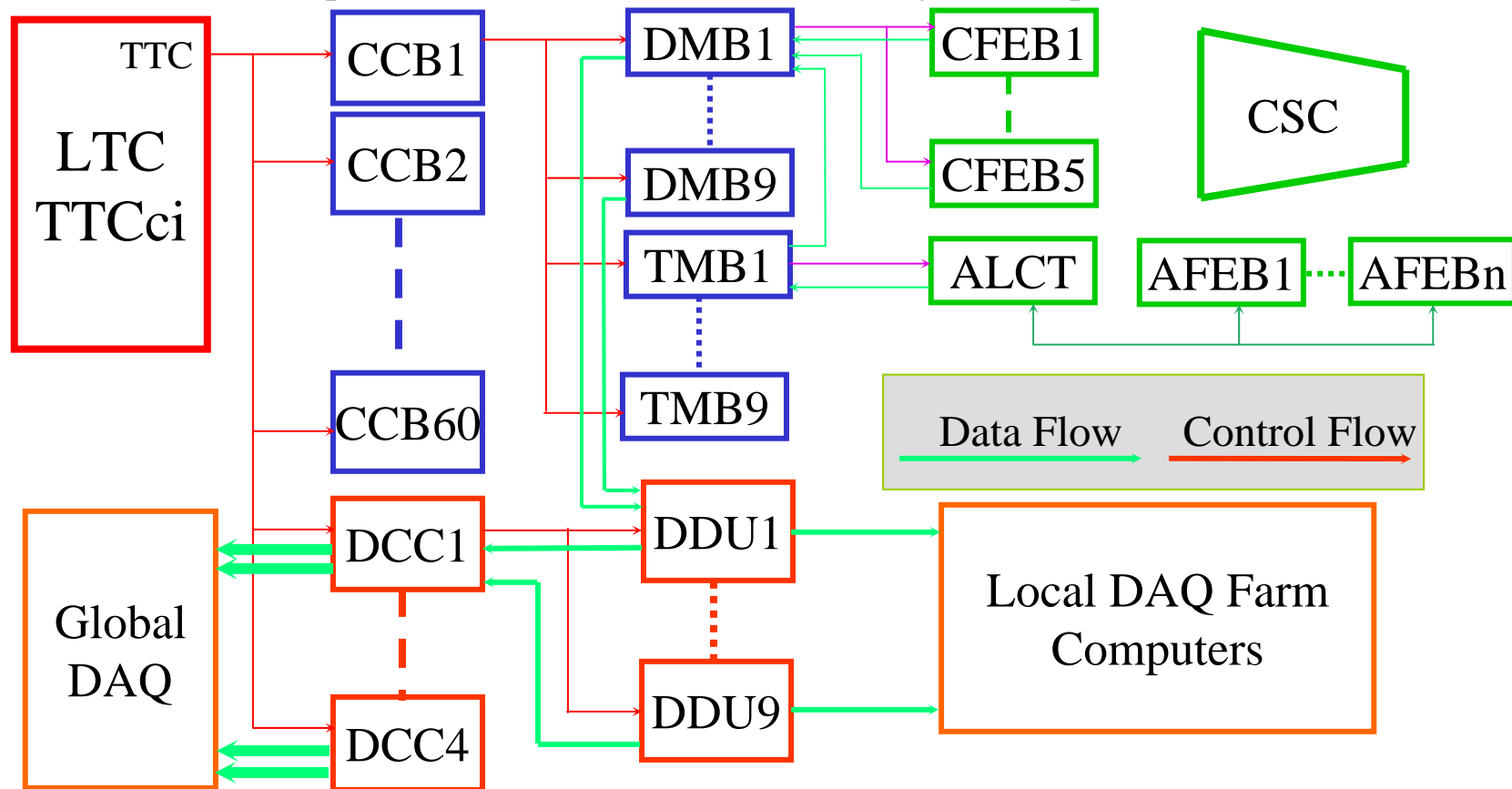




# LTC Calibration

Calibration procedure: (fast and efficient)

1. Set the electronics (LTC, TTCci, CCB, TMB, DMB) to calibration mode, if necessary
2. Loop over 16-channels, and CFEB channel setup
3. Loop over N\_steps in calibration (pulse size, setup DMB DAC; Time-Spread, setup delays)
4. Ask LTC for N\_pulse 'TTC\_Cal command followed by L1A sequence'





# ***LTC Calibration***

## **Broadcast command:**

- \* VME Controller, broadcast MAC: FF:FF:FF:FF:FF:FF
- \* Peripheral crate: TMB slot #26, DMB slot #25
- \* CFEB: set CFEB\_in\_use to binary 11111

## **Current Status:**

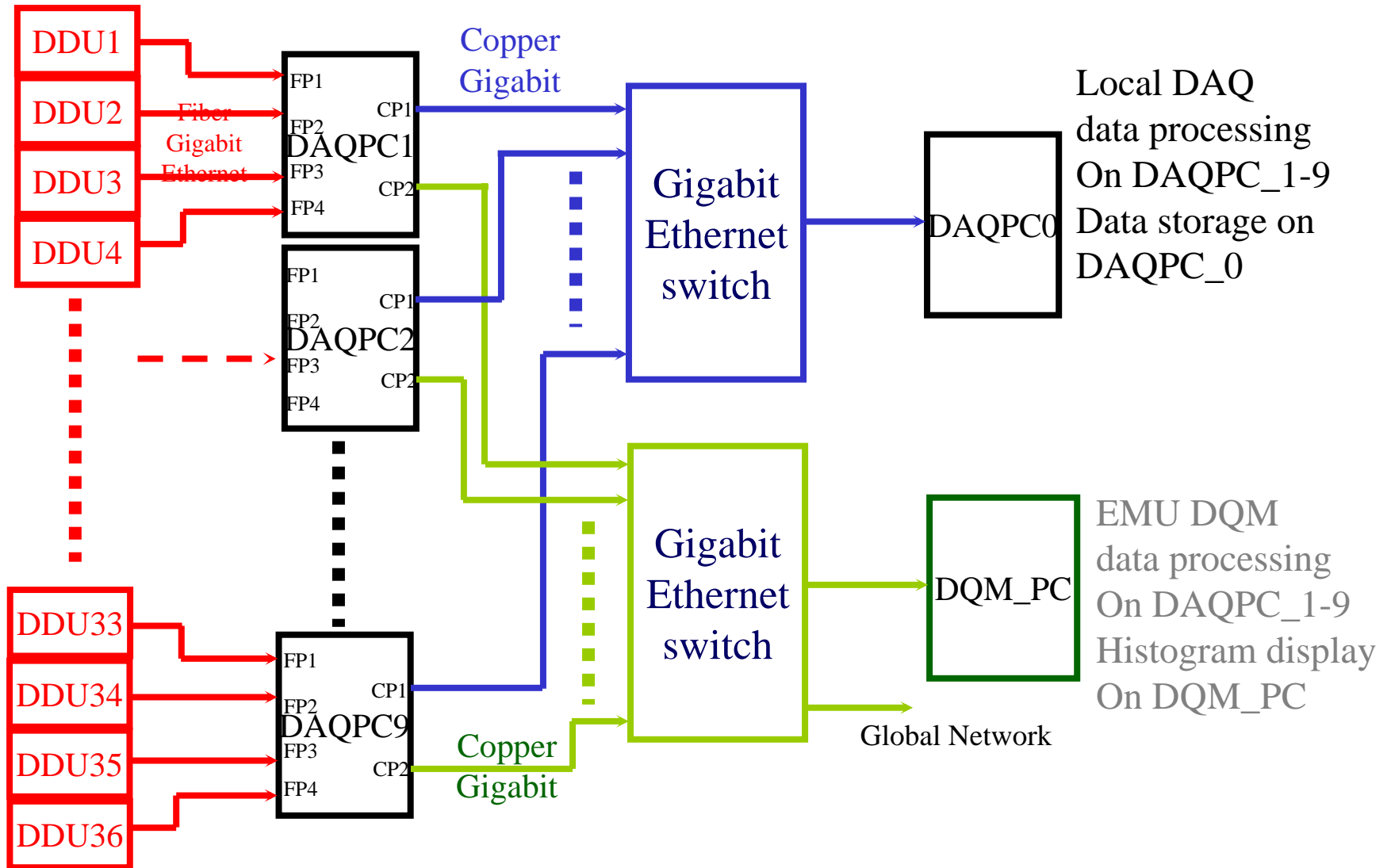
- \* CCB level calibration is used
- \* Broadcast: Hardware/firmware READY, tested at 904.
- \* Martin wrote the LTC/TTCci related software, need test and expansion

## **Work to do:**

1. Test and debug the LTC/TTCci related software and all levels of broadcast during MTCC2
2. Expand the LTC/TTCci software and implement the CFEB Precision Pulsing
3. Expand the software for all the other calibration procedures



# EMU Local DAQ Farm





## EMU Local DAQ Farm

**Main purposes:** Take calibration data; LHC data monitoring/data taking.

**Hardware:** 36 DDUs with Fiber Gigabit ethernet interface

Intel Pro/1000 Dual-port PCI-X NIC

**Data Rate:**

Precision CFEB calibration:

- 16 channels
  - 20 steps for the range
  - 100 pulse per setting
- 32K full events → ~100 Gbytes  
(Time\_spread calib → 1 Gbytes)



**All CSCs can be done in less than 20 minutes**

Prototype Computers are in Green Barrack and OSU

10 Local DAQ computers and Two switches: [Order in Progress](#),



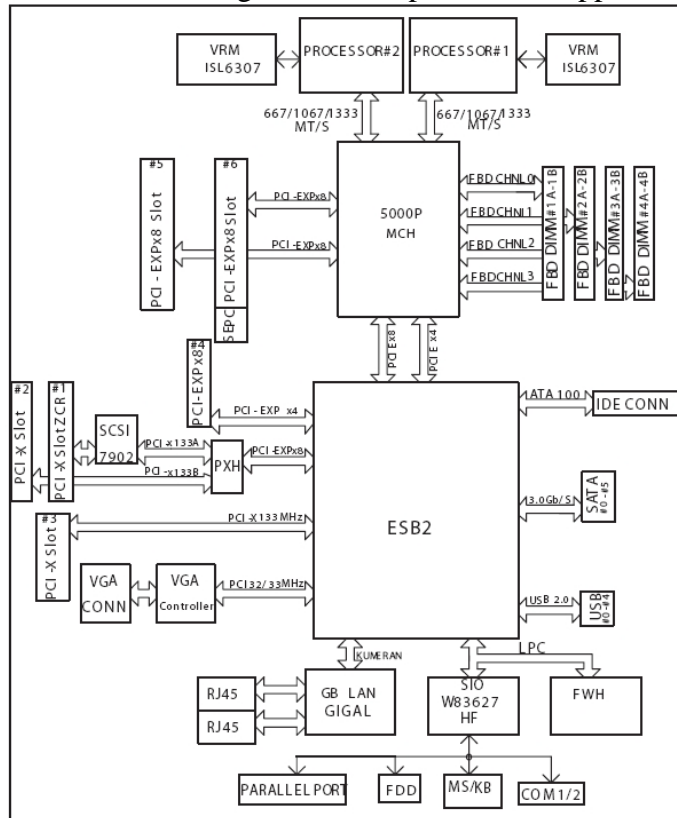
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# Backup slide: Computer structure

## SuperMicro X7DBE:

- 6 SATA-3.0 port
- Three PCI-E (X8)
- Two Gigabit Ethernet built-in
- The Arrangement can optimize our application



## Two prototype computers:

- Motherboard: [Supermicro X7DBE](#)
- CPU: [Two Intel Xeon 3.2GHz Dual-core](#)
- Memory: [4GB FB memory](#)
- Fiber ethernet card: [Intel Dual-port PCI\\_Express fiber gigabit server card](#)
- Hard Drive: [4 SATA-3.0 disk raid \(soft raid\)](#)
- 2U/4U rackmount case



## Intel 9402PF:

- Dual Fiber gigabit Ethernet port
- PCI\_E (x4) interface >10Gbit/s
- Good software support
- PCI-E newer technology, may well pass LHC life

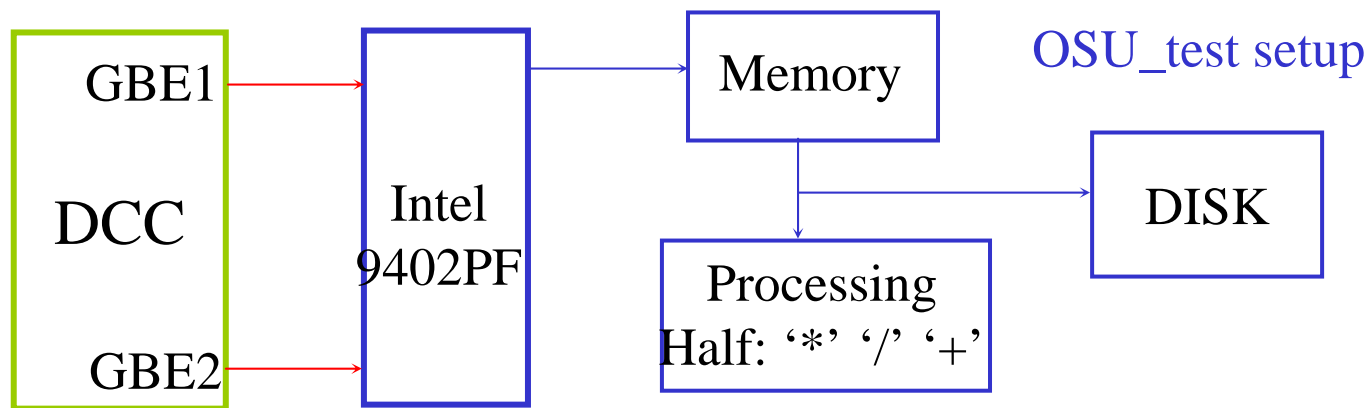


## Backup slide: Computer test

EmuFarmTest: two Intel card (four fiber ports): no problem

Four disks softraid0 (1 TB): > 75MByte/s Read&Write, ~150MByte write only

CPU resource: 8 logic CPUs



OSUTest: One Intel card (two fiber ports)

Three disks softraid0

Achieved: ~100MByte/s average data

rate to disk, while CPU usage is 25%

**Satisfactory with the computer**

Computer Cost:

Motherboard: \$450

2 CPU: \$700

2 Fiber NIC: \$1000

4 GB memory: \$600

2U case: \$300

1 TB disk: \$400

**Total: \$3,500 (\*10)**